

Replacement Paragraphs of the Specification

Following is a replacement section of the specification, namely a replacement of the brief description of the drawings at page 4 at 0000-0013, adding new references to Figs 8 and 9.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1, 2, and 3 are illustrative screens in the commercially available systems for solving engineering problems;

Fig. 4 is illustrative screen for problem identification, search query, and for a search response in a system in accordance with the principles of this invention;

Fig. 5 is a high-level architecture diagram of one embodiment of a system in accordance with the principles of this invention;

Fig. 6 is a flow diagram of a system in accordance with the principles of this invention; and

Fig. 7 is an illustrative screen showing a problem analysis tool for root cause analysis.

Fig. 8 is an illustrative screen showing a search underway in accordance with the principles of the invention.

Fig. 9 is an illustrative screen showing the results of a search as in Fig. 8

The following shows an amendment by adding the figure reference “Fig. 4.” to the last paragraph on page 6 over to page 7, at 0019.

The second element introduced to the problem analysis tools is a query formulator. In one embodiment, the machine representation of a function model is used as the source of key elements with which to build a query. For example, in Figure 2, the arrow labeled “scrub” which connects the system component labeled “liquid soap” to the system component labeled “hand” represents the need to find a mechanism by which liquid soap can be made to scrub hands. Referring to Fig 4, in this example, in one embodiment, the connecting arrow is interpreted as a desired action (scrub) and the system component labeled “hand” is interpreted as the object of the desired action (these are displayed at “Problem

Description”). Along with the graphical display of the problem description the Problems & Solutions portion of the screen provides proposed approaches to solve the problem. Using the functional relationship the system constructs the query “How to scrub the hand?” as a query to be submitted to the knowledge search tool by automatic reformulation by translating the functional relationship into a natural language query. The query is shown in the Solutions portion of the screen which also shows the several types of knowledge bases that are available to the user. These knowledge bases are resident in three possible places. One is on the user’s own computer memory, or portable memory devices such as CDs that can accessed at the user’s location. Another is called Corporate Knowledge which is typically on one or more servers resident or privately accessible to user’s within the organization such as a corporation. Another is publicly accessible search engines and databases such as Google (a search engine) and the U.S. Patent and Trademark Office patent collection (a searchable database). In one embodiment, an entry in the Problem & Solutions window will be automatically selected (or it can be programmed to allow the user to select) and similarly will automatically start the searching of the three categories of databases. The software allows configuration by a user to, for example, rewrite the Query, and to limit the search. As shown in Fig 8, the automatic (or user selected) search of all three categories is underway (see “searching” on the right side). In Fig 9 there is shown that searching is completed with 3 relevant results in the Corporate Knowledge database, but no results in the other databases. Fig 9 shows the results of the search posted along with necessary links to access the results.

Please add the following new paragraph before the first new paragraph starting on page 8, that is between paragraphs 0019 and 0020.

Fig. 7 shows a root cause analysis of a problem. The problem can be characterized starting with an undesirable event, namely "car is too old". The question is asked, why is the car too old, and the answer given is "insufficient engine power". That is, "insufficient power" is the cause of "car is too old"; and similarly "engine runs rough" is the cause of "insufficient power". Such a root cause analysis will provide artifacts within the processor that can be reformulated as a natural language query.